ABSTRACT - ORAL

Digital Light Processing of Pore Former Based Porous Structures for Biomedical Applications

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Ceria-stabilized zirconia ceramics are highly suitable for dental restorations due to their strength, biocompatibility, and resistance to low-temperature degradation. Additive manufacturing (AM) techniques, such as digital light processing (DLP), provide a precise approach for fabricating these ceramic parts. The paste, containing 12 mol% ceria-stabilized zirconia with 20 wt% alumina nanopowder, was prepared by speedmixing, with a proper addition of dispersant, monomers, diluents, and photo-initiator. Porosity was introduced by incorporating starch or polymethylmethacrylate (PMMA) as pore-forming agents, which decompose during the debinding stage, leaving behind a porous network. The pore size and distribution were influenced by the pore former particle size and its homogeneous dispersion within the paste. Key parameters, paste formulation, UV exposure time, and LED light power were fine-tuned to achieve high-resolution prints with minimal defects. Preliminary findings highlight the advantages of DLP in producing intricate geometries with uniform properties like dimensional accuracy and uniform paste distribution.